
LD 60: Digital Trunk Interface and Primary Rate Interface Diagnostic

The LD 60 diagnostic program can be run in midnight routines or loaded manually to enter commands.

On Option 11 Systems, LD 60 is used to maintain:

- NTAK20 Clock Controller
- NTAK09 1.5 Mb/s (DTI/PRI) Interface Card
- NTAK10 2.0 Mb/s (DTI) Interface Card
- NTAK79 2.0 Mb/s (PRI)

This program is used to maintain the following on other systems:

- QPC471/775 Clock Controller
- QPC472 1.5 Mb/s Digital Trunk Interface (DTI)
- QPC536 2.0 Mb/s Digital Trunk Interface (DTI2)
- QPC720 Primary Rate Interface (PRI)
- NT8D72AA 2.0 Mb/s Primary Rate Interface (PRI)

Channel Timeslot Mapping

If a system loop is configured with a SYS-12, AXE-10 SWE, NUMERIS, SwissNet D-channel (SWISS), TCNZ, or EuroISDN, then the following message to explain the difference in timeslot to channel mapping between the Meridian 1/Meridian SL-1 and the public network will be printed on loading the O verlay. The heading will differ according to the interface supported by the phase.

Example Message:

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M 1/SL-1 —  SYS-12
              AXE-10 SWE
              NUMERIS
              SWISS
              TCNZ
              EuroISDN
```

Table 21: Channel Timeslot Mapping

Channel	M 1/SL-1	Network	Timeslot
B	1-15	1-15	1-15
B	16-30	17-31	17-31
D	31	16	16

Basic Commands

DTI/PRI commands

ATLP (0), 1	Disable (default) or enable midnight auto loop test
CDSP	Clear maintenance display to 00 or blank
CMIN ALL	Clear minor alarm indication on all attendant consoles
CMIN c	Clear minor alarm indication on attendant consoles for customer c
DISI loop	Disable loop when all channels are idle
DISL loop	Disable network and DTI/PRI cards of loop
DLBK loop	Disable remote loop back test per RLBK command
DLBK I ch	Disable remote loop back test per RLBK I ch command
DSCH I ch	Disable channel ch of loop
ENCH loop	Enable all channels on 2.0 Mb/s DTI/PRI
ENCH I ch	Enable channel ch of DTI/PRI loop
ENLL loop	Enable network and DTI/PRI cards of loop
LCNT (loop)	List contents of alarm counters on one or all DTI/PRI loops
LOVF c r	List threshold overflows for customer c (0-99) and route r (0-511)
RCNT	Reset alarm counters of all DTI/PRI loops
RCNT loop	Reset alarm counter of DTI/PRI loop
RMST loop	Perform self-test on loop
RMST I ch	Perform self-test on specified channel (2.0 Mb/s DTI/PRI only)
RLBK loop	Close loop at carrier interface point for testing
RLBK I ch	Close channel ch at carrier interface point
RSET I ch	Reset thresholds for channel ch
SLFT loop	Invoke hardware self-test on loop
SLFT I ch	Invoke partial hardware self-test on channel ch
STAT	Get status of all loops
STAT loop	Get status of DTI/PRI loop
STAT I ch	Get status of channel ch

Clock controller commands

DIS CC x (0,1)	Disable system clock controller x (0 or 1)
DSCK loop	Disables the clock for loop
DSYL loop	Disable yellow alarm processing for loop
ENCK loop	Enable the clock for loop
ENL CC x (0,1)	Enable system clock controller x (0,1)
ENYL loop	Enable yellow alarm processing for loop
EREF	Enable automatic switchover of system clocks
MREF	Disable switchover of system clocks
SSCK x (0,1)	Get status of system clock x (0,1)
SWCK	Switch system clock from active to standby
TRCK aaa	Set clock controller tracking to primary, secondary or free run

Option 11 commands

The following commands are applicable to Option 11 systems:

ATLP (0), 1	Disable (default) or enable midnight auto loop test. Automatic Card Test, checks the same functions as the self-test.
DIS CC 0	Disable system clock controller 0.
DISI card	Digital card is disabled only when all the channels are IDLE. STATUS LEDs are lit. Channel states and loop state are set to DSBL.
DISL card	Disables Digital card. Active calls are forced disconnected by on-hook simulation. All channels are marked as DSBL.
DLBK card	Disables remote loop back test of RLBK on card. Card will remain in DSBL state.
DLBK c ch	Disables remote loop back test on channel ch of card c. The channel will remain in DSBL state.
DSCH c ch	Channel ch of Digital card c is disabled. Status of the channel is marked DSBL.
DSCK card	Disable the clock for card. (Applicable for secondary reference only.)
DSYL card	Disable yellow alarm processing for card.
ENCH card	Enable all the channels on card. The status of each equipped channel will be set to IDLE.
ENCH c ch	Channel ch of card is enabled. The status of the channel is marked IDLE.
ENCK card	Enable the clock reference for secondary clock only.
ENL CC 0	Enable system clock controller 0
ENLL card	Enables card. All channels are set to IDLE status.
ENYL card	Enable yellow alarm processing for card.
LCNT	Prints contents of all alarm counters of all Digital cards.
LCNT card	Prints contents of all alarm counters for card.
RCNT	Resets all alarm counters of all Digital cards.
RCNT card	Resets all alarm counters for card.
RLBK card	Performs external loop back test on card. (Card must be disabled.)
RLBK c ch	Performs external loop back test on channel ch of card c. (Channel must be disabled.)
RMST card	Performs a far end loop test on card. (Card must be disabled.)
RMST c ch	Performs a far end loop test on channel ch of card c. (Channel must be disabled.)
RSET c ch	Reset thresholds for channel ch

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SLFT card	Invokes Digital hardware self-test on card. (Card must be disabled.)
SLFT c ch	Invokes Digital hardware self-test on channel ch of card c.
SSCK (0)	Get status of primary system clock 0.
STAT card	Prints status (BUSY/IDLE/DSBL/MNT-BUSY) of all channels on card.
STAT c ch	Prints status (BUSY/IDLE/DSBL/MNT-BUSY) of channel ch on card c.
TRCK aaa	Set clock controller tracking to primary, secondary or free run.

Alphabetical list of commands

Command	Description	Pack/Rel
ATLP (0), 1	Disable (0) or enable (1) daily routine auto loop test. Where: • 1 = loop test enable; causes far-end to raise and clear yellow alarm • 0 =run the partial loop test; there is no interaction for far-end loop (default value) LD 60 is included in the daily (midnight) routines if defined by LD 17 prompt DROL. ATLP is only run if LD 60 is included in the daily routines. If ATLP = 1, and all 24 channels on the loop are idle, then the DTI/PRI card is disabled and a self-test is performed on each channel. All DTI/PRI cards are tested, one at a time. If a D-channel is on the loop, it is temporarily released and reestablished. If one or more channels are busy, the test is not performed on the loop. If ATLP = 0, then an "AUTO TEST DSBL" message is output and only one channel is tested. The channel is randomly selected by software, it cannot be specified. Automatic Card Test, checks the same functions as the self-test. (Option 11)	dti/pa-5
CDSP	Clear maintenance display to 00 or blank.	dti/pa-5
CMIN ALL	Clear minor alarm indication on all attendant consoles.	dti/pa-5
CMIN c	Clear minor alarm indication on attendant consoles for customer c.	dti/pa-5
DIS CC 0	Disable system clock controller. (Option 11)	
DIS CC x (0,1)	Disable system clock controller 0 or 1. CPU 0 must be idle to disable CC 0. CPU 1 must be idle to disable CC 1. To switch CPUs, use the SPCU command in LD 35.	dti/pa-5
DISI card	Card is disabled only when all the channels are IDLE. STATUS LEDs are lit. Channel states and loop state are set to DSBL. (Option 11)	

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DISI loop	Disable DTI/PRI loop when all channels are idle. The network and DTI/PRI cards are then disabled and status LEDs are lit. Channel status is set to BSY. Enter END to abort. When the PRI is physically connected to a DCHI card, the D-channels must be disabled first using LD 96.	dti/pri-5
DISL card	Disables card. Active calls are force disconnected by on-hook simulation. All channels are marked as DSBL and status LEDs are lit. (Option 11)	
DISL loop	Disable network and DTI/PRI/DTI2/PRI2 cards of loop. (PRI & PRI2 loops cannot be disabled unless associated D-channel is disabled first using LD 96). Active calls are force disconnected by on-hook simulation. All channels are disabled and status LEDs are lit.	dti/pri-5
DLBK card	Disables remote loop back test of RLBK on card. Card will remain in DSBL state.(Option 11)	
DLBK c ch	Disables remote loop back test of RLBK on channel ch. The channel will remain in DSBL state. (Option 11)	
DLBK loop	Disable remote loop back test per RLBK command. Loop remains disabled.	dti/pri-5
DLBK l ch	Disable remote loop back test per RLBK loop ch command. The channel remains disabled.	dti/pri-5
DSCH c ch	Channel ch of Digital card is disabled. Status of the channel is marked DSBL. (Option 11)	
DSCH l ch	Disable channel ch of loop l.	dti/pri-5
DSCK card	Disable the clock for card. For secondary clock reference only. (Option 11)	
DSCK loop	Disables the clock for loop, which does not have to be previously defined as the primary or secondary clock source.	dti/pri-5
DSYL card	Disable yellow alarm processing for card. (Option 11)	
DSYL loop	Disable yellow alarm processing for loop.	dti/pri-5

ENCH card	Enable all the channels of 2.0 Mb/s Digital card. The status of each equipped channel will be set to IDLE. (Option 11)	
ENCH c ch	Channel ch of Digital card c is enabled. The status of the channel is marked IDLE. (Option 11)	
ENCH loop	Enable all channels on DTI2 loop.	dti/prs-5
ENCH l ch	Enable channel ch of loop. For TIE trunks with A+B signaling, the channel is set to the same state as the far-end. The far-end refers to the status of the channels as presented by DTI T1 port. With B-channel signaling, channels are placed into the IDLE state and made available for calls.	dti 2 - 5
ENCK card	Enables the secondary clock reference. Primary clock reference can not be disabled through this command. (Option 11)	
ENCK loop	Enables the clock for loop, which must be previously defined as a primary or secondary clock source via service change.	dti/prs-5
END	Aborts the program.	dti/prs-5
ENL CC 0	Enable system clock controller. (Option 11.)	
ENL CC x	Enable system clock controller 0 or 1.	dti/prs-5
ENLL card	Enables card. All channels are set to IDLE status. (Option 11)	
ENLL loop	Enable network and DTI/PRI/DTI2/PRI2 cards of loop. For TIE trunks with A+B signaling, the channels are set to the same status as the far-end; otherwise, the channels are set to idle status. The far-end refers to the status of the channels as presented by DTI T1 port. Status LEDs are deactivated. With B-channel signaling, channels are placed into the IDLE state and made available for calls.	dti/prs-5
ENYL card	Enable yellow alarm processing for card. (Option 11)	
ENYL loop	Enable yellow alarm processing for loop.	dti/prs-5

EREF	Enables automatic switchover of primary and secondary reference clocks. Also enables recovery to primary or secondary clocks when loops associated with these clocks are automatically enabled. (not supported for Option 11)	dti/pri-5
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LCNT (card)	List contents of alarm counters on one or all of the cases listed after LCNT (loop) command. (Option 11)
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LCNT (loop)	List contents of alarm counters on one or all of the following cases:	dti/pri-5
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Case 1 1.5 Mb/s DTI/PRI

The counters are:

- BPV = bipolar violation counter
- SLIPD = frame slip deletion counter
- SLIPR = frame slip repetition count
- LOSFA = loss of frame alignment counter
- OS_BPV = 24-hr bipolar violation counter
 - a** For PRI with D2, D3, or D4 framing format, 24-hr bipolar violation counter
 - b** For PRI with Extended Superframe Format, 24-hr Cyclic Redundancy Check (CRC) counter
- OS_LOSFA = 24-hr loss of frame alignment counter
- OS_YEL = 24-hr yellow alarm counter

Case 2 2.0 Mb/S DTI

The counters are:

- G1 alarms
- BPV = bipolar violation counter
- FAP = frame alignment threshold counter
- SLP = maintenance threshold slip counter
- CRC = cyclic redundancy threshold counter
- AIS = alarm indication signal
- AIS64 = 64 Kb/s alarm indication signal
- FAL = loss of frame alignment
- MFAL = loss of multiframe alignment
- BIT3 = bit 3 error
- BIT6 = bit 6 error
- CFAS = loss of crc-4 multiframe alignment (Option11 only)

Case 3 2.0 Mb/s PRI

The counters are:

- BPV = bipolar violation counter
- CRC = cyclic redundancy threshold counter
- FAP = frame alignment threshold counter
- SLP = maintenance threshold slip counter
- AIS = alarm indication signal
- LFAS = loss of frame alignment signal
- LMAS = loss of multiframe alignment signal
- RAI = remote alarm indication
- LOS = loss of signal

LOVF c r	List threshold overflows for customer c (0-99) and route r (0-511). The overflows are set when the resident trunk monitor outputs a diagnostic message. Defined thresholds are HOLD, ILLR, REPT, SEIZ and SVFL (see LD 16).	dti/pa-5
MREF	Disable switchover of system clocks. Also disables recovery to primary or secondary reference clocks when loops associated with these clocks are automatically enabled. (not supported for Option 11)	dti/pa-5
RCNT (card)	Reset alarm counters for all or specified card only. (Option 11)	dti-16
RCNT (loop)	Reset alarm counters for all or specified loop only. If the DTI loop was disabled due to an error threshold overflow and the DTI may be enabled automatically when the counter is cleared, then before performing any command, such as test, that requires the DTI to be disabled you should: 1. disable the DTI 2. list the counters with the LCNT command 3. reset the counters with the RCNT command 4. do the test commands	dti/pa-5
RLBK card	Performs external loop back test on card. (Card must be disabled). (Option 11)	
RLBK c ch	Performs external loop back test on Digital Channel ch of card. (Channel ch must be disabled). (Option 11)	

RLBK loop	Close loop at carrier interface point for testing. Allows the far-end to perform an external loop back test on the carrier span using the RMST command. This command closes the loop at the carrier interface point of the DTI/PRI. The DTI/PRI loop must be disabled first using the DISI or DISL loop commands.	dti/pr-5
RLBK l ch	Close channel ch at carrier interface point. Allows the far-end to perform an external loop back test on the carrier span. The loop remains enabled, but closes the specified channel at the carrier interface point of the DTI/PRI. The DTI/PRI channel must be disabled first using the DSCH loop ch command.	dti/pr-5
RMST card	Performs a far end loop test on card. (Card must be disabled). (Option 11)	dti-16
RMST c ch	Performs a far end loop test on Channel ch of card c. (Channel ch must be disabled). (Option 11)	dti-16
RMST loop	Perform remote loop back test on loop. The far-end must be in the remote loop back mode. (RLBK command has been issued at the far-end)	dti/pr-5
RMST l ch	The far-end channel must be in the remote loop back mode. (RLBK command has been issued at the far-end)	dti 2 - 14
RSET c ch	Reset thresholds for channel ch on card c. (Option 11)	
RSET l ch	Reset thresholds for channel ch on loop l.	dti/pr-5
SLFT card	Invokes Digital hardware self-test on card. (Card must be disabled). (Option 11)	
SLFT c ch	Invokes Digital hardware self-test on channel ch on card c. (Option 11)	
SLFT loop	Invoke DTI/PRI hardware self-test on loop. This command tests speech path continuity, zero code suppression, remote alarm detection, and A&B bit signaling. The loop must be disabled first using the DISI or DISL loop command.	dti/pr-5

SLFT I ch	Invoke partial hardware self-test on channel ch. The DTI/PRI channel must be disabled first using the DSCH command.	basic-1
SSCK (0)	Status of Primary clock (Option 11)	
SSCK x	Get status of system clock 0 or 1. The SSCK command indicates the active controller as well as active primary or secondary reference clock source or free run. Response may be: 1. AUTO SWREF CLK - ENBL = automatic switchover of system clocks enabled 2. AUTO SWREF CLK - DSBL = automatic switchover of system clocks disabled 3. CLOCK ACTIVE = the active controller 4. DSBL = clock disabled 5. ENBL = clock enabled 6. REF CLK ERR = possible faulty cable from CC to DTI/PRI, or faulty Clock Controller 7. SYSTEM CLOCK - FREE RUN, PREF or SREF = clock is in free run mode or tracking to the primary (PREF) or secondary (SREF) reference loop 8. VCXO AGING ERROR = the timing crystal is faulty, replace the clock	dti/pa-5
STAT	Get status of all digital loops. The types of loops are: 1. PRI = Primary Rate Interface 2. PRI2 =2.0 Mb/s Primary Rate Interface 3. DTI = Digital Trunk Interface 4. DTI2 =2.0 Mb/s Digital Trunk Interface 5. DLI = Digital Link Interface 6. JDMI = Japan Digital Multiplex Interface	dti/pa-5
STAT card	Prints status (BUSY/IDLE/DSBL/MNT-BUSY) of all channels on Digital Card. See STAT loop for possible responses. (Option 11)	dti-16
STAT c ch	Prints status (BUSY/IDLE/DSBL/MNT-BUSY) of channel Ch, for Digital card. (Option 11). See STAT I ch for possible responses.	dti-16

STAT loop Get status of digital loop. Sample output: dti/prs-5

AAA TRK LOOP x - **BBBB**
SERVICE RESTORE: YES/NO
YEL ALM PROCESS: YES/NO
ALARM STATUS: NO ALARM/RED(local) ALARM

Where: **AAA** may be :

1. DTI
2. DTI2
3. PRI
4. PRI2
5. TIE
6. DID
7. DTI LINK (DTI link loop = DLI)

Where: **BBBB** may be:

1. DSBL = Hardware of specified digital loop is disabled
2. ENBL = Hardware of specified digital loop is enabled
3. RLBK = Hardware of specified digital loop is in remote loop back mode
4. DISI PENDING = DSI command is in progress
5. TRACKING = system clock is tracked to this loop
6. IDLE = Hardware of specified digital loop is idle
 When **AAA** = TIE, IDLE ISPC indicates that the channel is an established ISPC link ready to be used by any end-users having access to the associated ISPC route.
7. SERVER RCYV = server has not recovered status of DTI LINK loop. Channels will not be allocated for call processing until this status is removed by the server
8. BUSY = Hardware of specified digital loop is busy
 When **AAA** = TIE, BUSY ISPC indicates that the channel is an established ISPC link which is used by end users on the PBXs.
 When **AAA** = DID, BUSY ISPC indicates that the ISPC link is established to the Central Office. The status "BUSY" is independent to ISL feature usage of the ISPC link.
9. MSBY = Hardware of specified digital loop is in make busy mode

When **AAA** = TIE, MSBY ISPC indicates that the configured ISPC link is one of the following:

- a** not established yet
- b** established, but the ISL D-channel which controls its usage not established

Where: **SERVICE RESTORE** may be:

1. YES = restore service automatically if alarm is removed
2. NO = loop can only be manually enabled

Where: **YEL ALARM PROCESS** may be:

1. YES = yellow alarm processing is enabled
2. NO = yellow alarm processing is disabled

Where: **ALARM STATUS** may be:

1. NO ALARM = no alarm active
2. RED = red (local) alarm active

Action 1:

1. list alarm counters (LCNT command)
2. check for DTA messages
3. go to the fault clearing section

Where:

- **YELLOW** = yellow (remote) alarm active
- **WAITING** = DTI/PRI card is not responding. The card either did not respond to a status check or did not respond when a red alarm was cleared. Go to Action 2.

Action 2:

1. check DTI/PRI status again
2. disable, then enable the DTI/PRI

STATE OF SERVICE:

- OOS = out-of-service
- NNC = no new call
- NNDC = no new data call
- MNT = maintenance

When an alarm is present (group 2 error), it is a REMOTE ALARM

REMOTE ALARM:

- NS = alarm indication signal
- RAI = remote alarm indication

LOCAL ALARM:

- LOS = loss of signal
- LFAS = loss of frame alignment signal
- LMAS = loss of multiframe alignment signal
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STAT I ch Get status of channel ch. Status may be: dti/pr-5

1. IDLE = channel is enabled and is idle
2. BUSY = channel is enabled and is call processing busy or channel is in a lockout state (far-end is disabled)
3. MBSY = channel is being used for maintenance busy, the D-channel is down, or far-end channel is disabled
4. DSBL = channel is disabled
5. DSBL (SERVER) = channel is being used for server maintenance and is disabled for the duration (1.5 Mb/s DTI digital link interface only)
6. FE MBSY = near end is idle, far-end is maintenance busy
7. FE DSBL = near end is idle, far-end is disabled
8. FE DSBL = far-end B-channel is disabled
9. FE MBSY = far-end B-channel is in maintenance mode
10. UNEQ = channel is not equipped

When the loop is a Phantom loop, it is possible to receive the status messages: TIE IDLE ISPC, TIE BUSY ISPC, or TIE MBSY ISPC. Interpret these system responses as they are interpreted for the command STAT loop. See the section which outlines BBBB alternatives for the STAT loop command on page 338.

SWCK	Switch system clock from active to standby. (not supported for Option 11) The reference clock source remains unchanged.	dti/pra-5
TRCK aaa	Set clock controller tracking to primary, secondary or free run. Where aaa is: • PCK = track primary clock • SCLK = track secondary clock • FRUN = free run mode Track primary clock (PCK) or secondary clock (SCLK) as the reference clock or go to free run (FRUN) mode.	dti/pra-5
